Faculty of Design

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Permaculture assessment: Processes for reliable flourishing

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RSD5 SYMPOSIUM

systemic design for social complexity

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SYSTEMIC DESIGN RESEARCH NETWORK

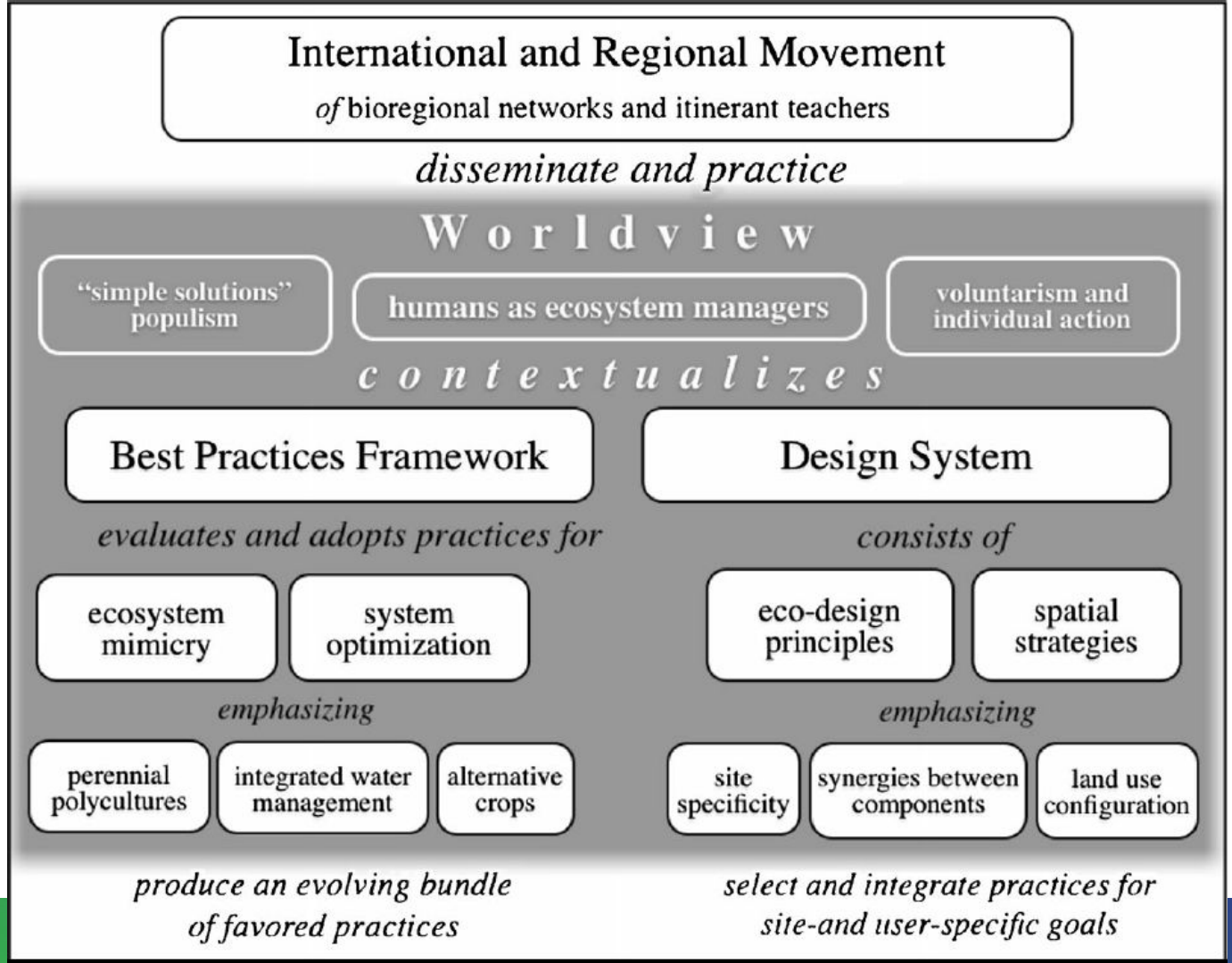
Permaculture Assessment

Encouraging Reliable Flourishing

@JohnBCassel
Agrible

Theory; No Case Studies

What is **permaculture**?

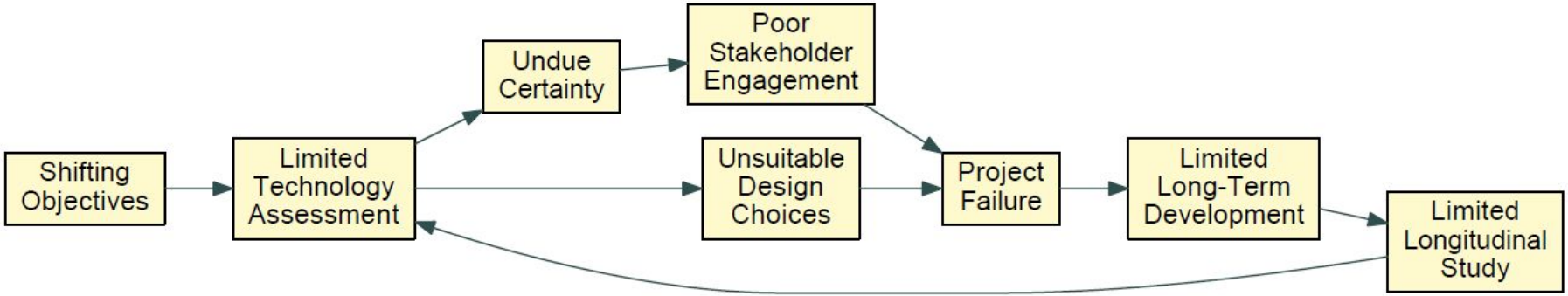


Permaculture for agroecology: design, movement, practice, and worldview. A review

Rafter Sass Ferguson & Sarah Taylor Lovell

Agronomy for Sustain. Development (2014) 34:251–274

DOI 10.1007/s13593-013-0181-6



Permaculture is addressing its challenges

Is permaculture assessment **possible**?

Toby Hemenway suggests not

His points are true

His points are true

but invite constructive responses

Permaculture is a toolbox of approaches (organic farming, agroforestry, renewable energy, water harvesting, etc.) that are already proven in their respective domains.

We don’t need scientific trials of permaculture

We need more scientific trials of permaculture-inspired agroecology

Permaculture needs more
program assessment

Aerospace engineering is also a toolbox

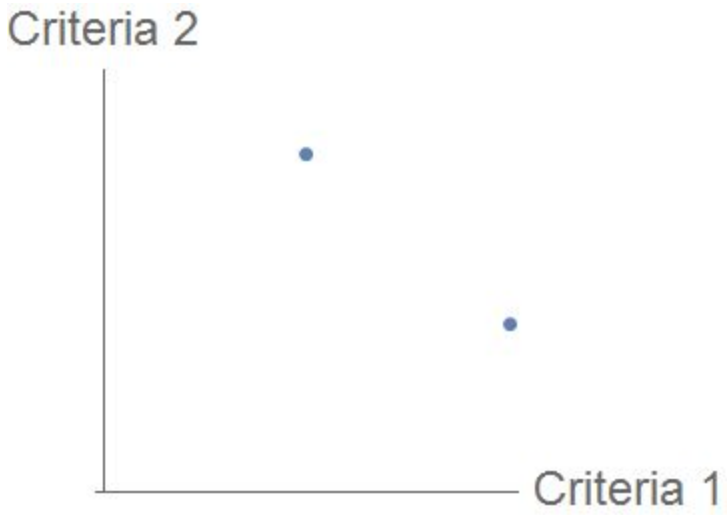
- Fluid dynamics
- Structural engineering
- Thermodynamics
- Control Systems
- Human Factors
- Finance
- Electronics
- etc.

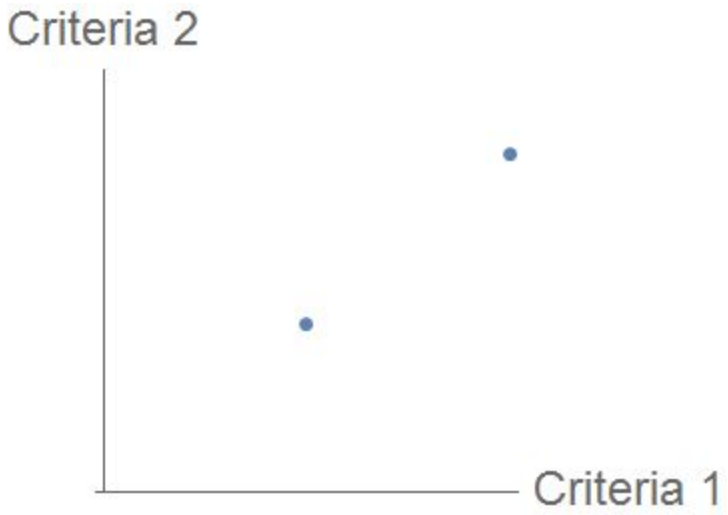
Aerospace engineering pays attention to operational methods for improving systems integration

Example

Multidisciplinary Design Optimization (MDO)

Each permaculture system makes a particular balance of food production, habitat provision, and input reduction that is impossible to assess against different goals.

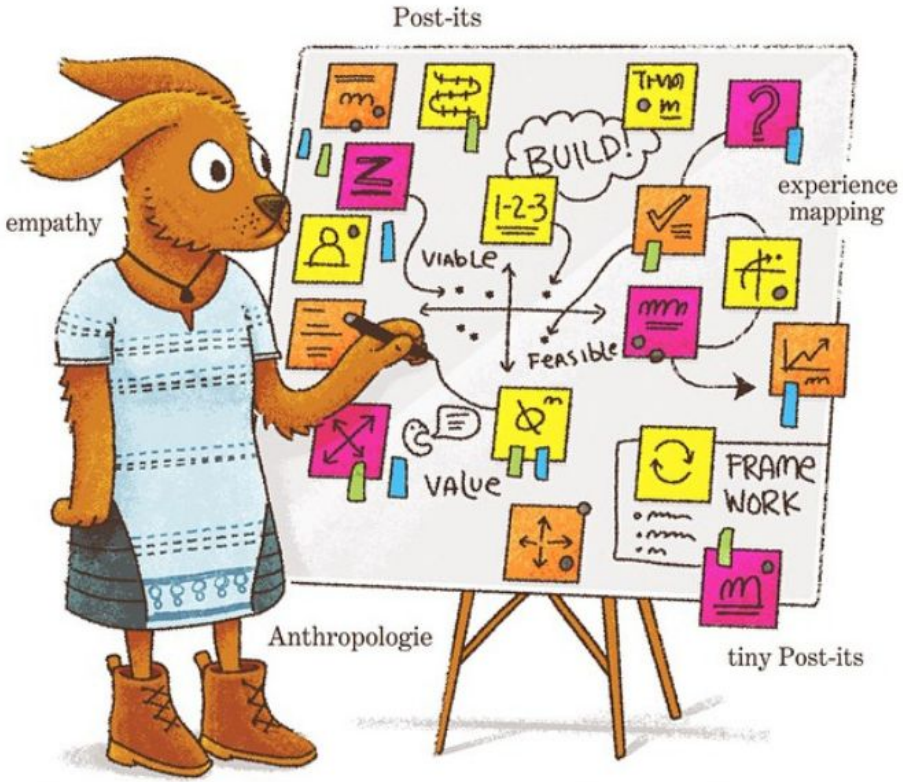

Criteria 2
Criteria 1


Criteria 2
Criteria 1

Not all criteria should be considered equal

If one were to compare designs based on the same goals but using similarly appropriate design processes, how could we measure the difference between the outcomes in any meaningful way?

From rigid goals,
domain-appropriate design approaches
should have similar results



The Innovation Strategist works with clients to define problems, ideate solutions, and articulate outcomes.

http://welcometobusinesstown.tumblr.com/image/110646060721

Designers *Discover* Needs

Assessment is not about comparing design processes, but determining if a given design process reliably leads to appropriate interventions

When one “measures permaculture”, what is one measuring?

We can agree that
“measuring permaculture”
is nonsense

Permaculture is all of these

- a design process
- a movement
- a set of best practices
- a worldview

Our focus:
permaculture's **design process**

We are interested in questions which help build useful critiques of the permaculture design process.

We are also interested in understanding the permaculture design process compared with differently-minded design processes

Permaculture creates systems that participants agree feel most alive and provides new lifeways. This phenomenological assessment supersedes reductionist particulars.

Living constrained by quantitative metrics is a lifeway humanity should try to avoid

A proper use of assessment is to expand the phenomenological richness of how we interpret our development

What does it mean to **assess** the permaculture design process?

We are interested in questions which help build useful critiques for a given undertaking of the permaculture design process.

Permaculture's Mission

To maximize the sustained flourishing of the resource-renewing cycles in which we participate

Design Process Expectations

1) Reliably discover substantive concerns
2) Reliably create appropriate interventions

Reliability at substantially improving the sustained flourishing of resource-renewing cycles that provide for the designer's human needs

Reliable Flourishing

What does design process **quality** consist of?

Design Process Qualities

- Result Quality
- Evaluation Strategy Quality
- Discovery Strategy Quality
- Purpose Quality

Result Quality

How good was the outcome given the kind of challenge it became? How did the outcome compare to similar interventions to similar problems?

Evaluation Strategy Quality

How thoroughly did we use what we know in evaluating the intervention? How much of the “space” of different alternatives did we cover?

Discovery Strategy Quality

At what rate did we continue to find the different conditions imposed by the situation? Did the rate at which we discovered impacts diminish?

Purpose Quality

How well did we find a problem worth addressing? Was what was actually implemented really worthwhile by standards external to the logic of the problem?

But what **difficulty** did the situation present?

Situation Challenge Severities

- Design and Implementation Costs
- Analytic and Computational Complexity
- Obscurity and the Unknown
- Ugliness of Trade-offs

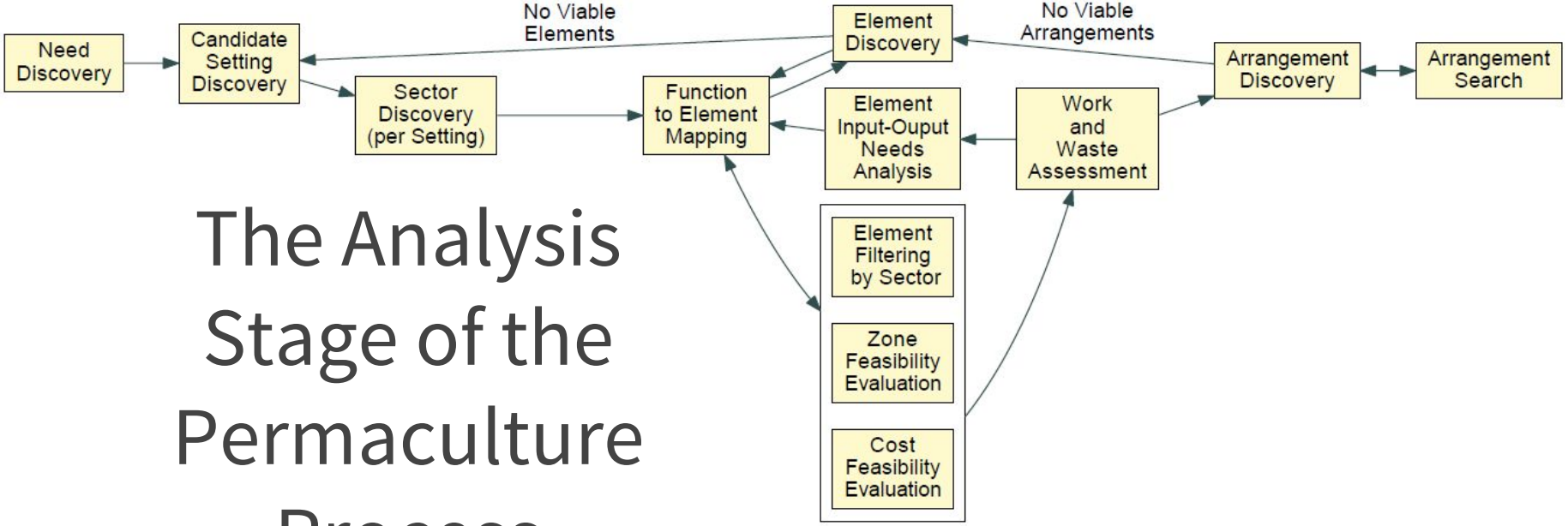
What do these qualities assume design **is**?

Implicit Model of Design

- Domain-specific Design Competencies
- Synthesis, Analysis, & Selection
- Discovery and Information Gathering
- Ethical Guidelines and Worldview

What is **permaculture design**?

The Analysis Stage of the Permaculture Process



Assessing a **particular** permaculture exercise

Result Quality

- Are the designer's needs reliably satisfied (produced, maintained, processed) with additional yields?
- How little waste is generated?
- How few external resources are required?
- How much work is required?

Evaluation Strategy Quality

- Were all of the needs designed to?
- Were all of the selected elements evaluated against potential sectors?
- Did we consider a significant range of element combinations?
- Did we consider a significant diversity of arrangements?

Discovery Strategy Quality

- Has the rate of finding new needs, elements, sectors, functions, and arrangements, decline as to become negligible?
- Were we ever surprised? At what rate?
- Did the design situation find cost/risk equilibrium?

Purpose Quality

- By virtue of the system, do we better take responsibility for the ecological presence of ourselves?
- Was the first purpose of the design to care for the earth, and then people?
- Did our design have a minimal footprint?

Cost Severity

- What work, waste, and external inputs were required to configure this new arrangement?
- How much of those were incurred in the design process versus establishment?

Severity of Complexity

- How incompatible were elements with each other?
- How many elements were eliminated by sector, zone, or cost constraints?
- How needy were the necessary elements?

Severity of Obscurity

- Were relevant design elements easily discovered?
- Was the interaction between elements known?
- Were the needs readily forthcoming?
- Were design-eliminating sectors still being discovered?

Trade-off Severity

- Did the only viable ecologically sound designs produce a dramatically lower quality of human life?
- Did taking care of people mean that there were no further conserved resources?

How effective is permaculture’s process guidance?

Each aspect is supported two ways

- Prior knowledge
- Operational guidance in executing processes

Permaculture Process Quality

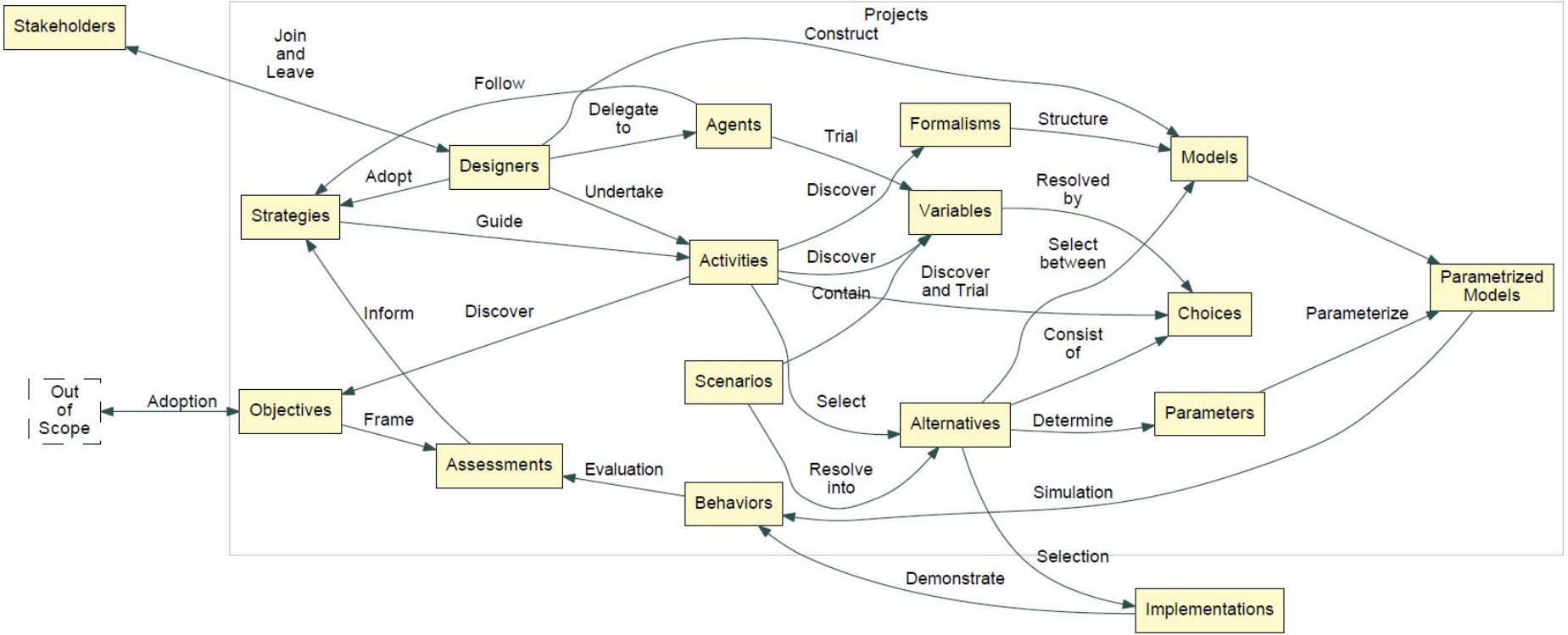
	Solution	Evaluation	Discovery	Purpose
Prior knowledge	Many well-known systems and teams	Team interactions becoming understood	Only rough categories for human needs	Simple and articulated ethics
Operational Guidance	Many appropriate instructions	Heuristic, Not MDO level	Part of Process	Early observation; boundaries

Permaculture as a design process among peers

We are also interested in understanding the permaculture design process compared with differently-minded design processes

Design Process Peers

Total Discipline	Analytical Framework
Risk Governance	Game Theory
Engineering (as it actually happens)	Engineering Design
Permaculture	System Dynamics

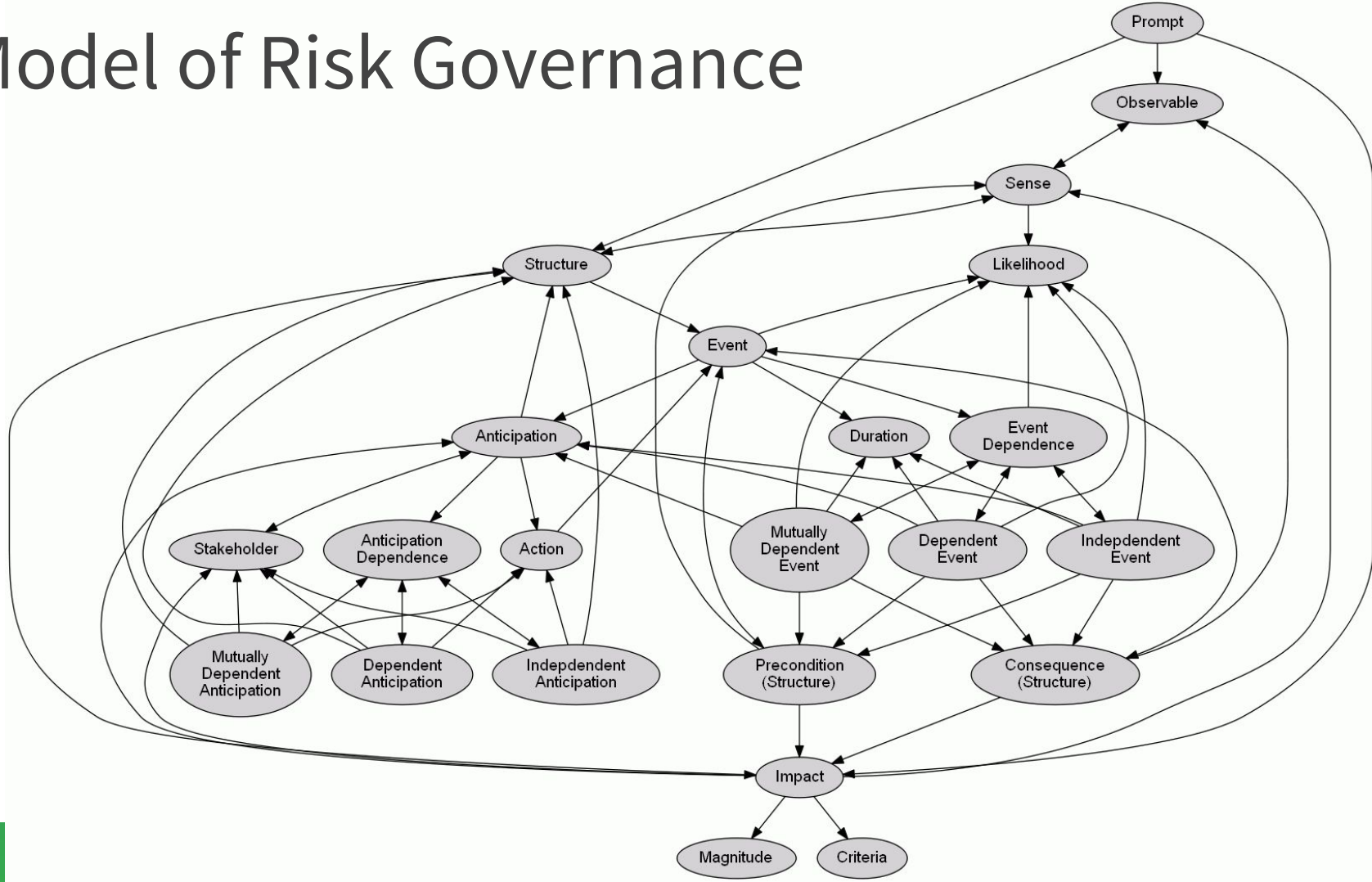


A Model of Engineering Design

Engineering Design Process Quality

	Solution	Evaluation	Discovery	Purpose
Prior knowledge	Many well-known systems	Simulation and Meta-modeling	Human factors and checklists	Professional responsibility
Operational Guidance	Well-developed Trades	Optimization and experimental design	Not considered	Not considered

A Model of Risk Governance



Risk Governance Process Quality

	Solution	Evaluation	Discovery	Purpose
Prior knowledge	Some well-known systems (expected)	Expert Analysis/ Public Deliberation	Known Risks to Human Life	Human Rights
Operational Guidance	Some developed approaches (expected)	Game theoretic analysis	Stakeholder Engagement	Assuring Rational Communication

Permaculture Process Quality

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Permaculture could also use Multidisciplinary Design Optimization

Generic Engineering Optimization

Minimize difference from goals

While maintaining constraints

By varying parameters

Optimization for Permaculture

Minimize waste, work, external inputs

Maintaining needed production, processing, and maintained conditions

By varying parameters determining elements and how they connect

Optimization for permaculture might be a bad idea

Takeaways

Permaculture is a purpose-rich design process that attends to ongoing discovery

Permaculture needs specific and detailed lists of shelter, nutritional, and social needs

Permaculture can borrow the optimization methods of engineering design

Thank you

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